

1985 REFERENCE GUIDE

Annual Index of Articles: 1984

ADMIXTURES

Control of Air Content: Variables that influence air content can be grouped into four categories: concrete materials and mix design, production procedures, construction practices, and environmental conditions. Each of the four categories is covered in this article by means of separate tables that list the effects of the different variables on air content and, if needed, corrective actions that can be taken. The article is a condensation of National Cooperative Highway Research Program Report 258: "Control of Air Content in Concrete." 5 pp; 84:717

AGGREGATES

Producers and Suppliers of Decorative Aggregates: A compilation of the names, addresses and phone numbers of companies that supply decorative or special-effect aggregates in North America. 1 p; 84:42

ARCHITECTURAL CONCRETE

National Gallery Exhibits the Cutting Edge of Contemporary Architectural Concrete: Since its dedication in 1978, the blade-sharp triangular structure of the East Building of the National Gallery of Art in Washington, DC has become world famous. This article focuses on some construction details that are illustrated with full color photography. 5 pp; 84:105

Meridian Hill Historic Exposed Aggregate Concrete: Concrete work at Meridian Hill Park in Washington, DC probably stands as the first refined large scale use of exposed aggregate concrete for architectural purposes. Built over a period of 12 or 13 years, many experimental techniques were investigated by architectural sculptor John J. Earley and the contractor before a method was devised for producing a color, texture and design integrity that has withstood the ravages of time remarkably well. 4 pp; 84:117

Formwork for Tooled Concrete: Illustrates and discusses the basics and the fine points involved in good tooling. Tooling refers to several kinds of mechanical fracturing used to achieve a particular visual effect by removing part of the concrete surface. Important aspects such as quality of formwork and its proper use are stressed, as are responsibilities of designers and detailers, and site control of operations. 3 pp; 84:397

Westin Hotel Construction Demonstrates the Concrete Advantage: A slipformed core, reinforced concrete framing system and precast architectural concrete panels were all elements that contributed to the rapid construction of a high-rise hotel. On the tower section of the hotel, precast panels were used as spandrel beams that were tied to the columns and flat-slab floors. Flying form tables commonly used with cast-in-place spandrel beams were modified for use with the precast spandrels. Construction details are given. 3 pp; 84:949

BRIDGES

Bridge Deck Repairs Completed Months Ahead of Schedule: Here are some of the details of how deck repairs on the Woodrow Wilson Memorial Bridge south of Washington, DC were completed seven months ahead of schedule and at a cost estimated to be \$300,000 less than would have been the cost for cold-mix asphalt repair. 1 p; 84:147

New Bridge Repair Technique—Fast and Inexpensive: A brief description is given of the Kansas Department of Transportation's technique, called "post reinforcement," for repairing overstressed concrete girder bridges having shear cracks in the girders. 1 p; 84:170

Underpass Installed Under an Operating Railroad with Minimum Shutdown: A unique system was used to construct and install a two-way underpass below two intersecting railroads. The box-like structure was precast on site and then shoved through an open cut that had been excavated beneath the railroad. The contractor was allowed just 48 hours of shutdown time by the railroad; the job was completed in 37 hours. 2 pp; 84:306

BUILDING CODES

The Model Building Codes System: The three major model building codes operative in the United States are delineated and the area over which each has jurisdiction is defined. While codes are written by three private, nonprofit organizations, input for the writing of the codes may come from any individual, company or organization. The method of operation of each of the three code-writing bodies is described. 4 pp; 84:23

A Threat to Our Industry—Guest Editorial: This is a discussion of proposed building code changes that the author feels could seriously restrict the concrete construction industry's ability to compete economically for construction dollars in parts of the country where structural design is controlled by seismic provisions in a code. 2 pp; 84:516

COMPOSITE CONSTRUCTION

Stability Problems with Steel-concrete Composite Construction: Some examples are cited of stability problems that may arise during erection and concreting of composite-frame buildings and bridges. A comprehensive discussion explains the principles of composite construction. 3 pp; 84:815

CONVEYING

Mixer-mounted Conveyors: This article describes a truck-mounted conveyor belt that provides precise placement and faster unloading by a single operator to deliver and deposit concrete. Loss of discharge capacity when long chutes are used and waiting while filling wheelbarrows or crane buckets are eliminated. Concrete can be placed as far as 40 feet from the truck at rates up to 60 cubic yards per hour with conveyor in horizontal position. Unit can also elevate concrete more than 22 feet, using hydraulic power to raise, lower and swing the conveyor while concrete is being placed. 2 pp; 84:19

CORROSION OF METALS IN CONCRETE

Sealers or Overlays?: After extensive studies of sealers and overlay materials, a team of consultants concluded that, "If your problem is protecting rebars by keeping deicing salts or wind-borne or water-borne sea salts out of concrete, don't select a sealer without considering the use of a concrete overlay. And just as important—don't select an overlay until you've thought seriously about using a sealer." A table and two charts graphically present the results of their research on the

effectiveness and comparative costs of many generically different types of sealers and on five specialty concretes for overlays. 3 pp; 84:503

Cathodic Protection: An Emerging Solution to the Rebar Corrosion Problem: This is an explanation of how and why the introduction of an externally applied electric current can prevent or stop rebar corrosion in concrete bridge decks and similar structures. Systems for installation of the electrodes which provide cathodic protection are described, along with systems for automatically regulating and controlling the amount of electric current entering the structure. The economics of cathodic protection are dealt with in some detail. 4 pp; 84:561

CUTTING

Beveled Metal Wheels and a Steel Track Keep Diamond-bladed Saw Exactly on Line: Nearly perfect cuts were needed for the decorative sawed joints in a highly polished, colored concrete floor. The contractor replaced rubber wheels on his power saw with steel wheels so that the saw could run on tracks. This produced very straight cuts with no raveling or chipping at the edges. 2 pp; 84:676

DESIGN

Small Gravity Retaining Walls: This article tells how tables developed by the Portland Cement Association can be used to simplify the design of small gravity retaining walls. The type of backfill soil affects design, as do several other factors including backfill slope, surcharge on the backfill and whether the face or back of the wall is vertical. A sample design is presented to illustrate use of the tables. 5 pp; 84:977

DRAINAGE

Prefabricated In-plane Drains: Without taking up much space, prefabricated mats or boards placed against underground walls can carry away groundwater and reduce lateral pressure. The drains usually consist of a drainage core and a filter fabric. Requirements for the fabric and core are discussed and several proprietary systems are described. Application examples are given. 5 pp; 84:955

EARTHQUAKE PERFORMANCE

Earthquakes and Reinforced Concrete: The history of earthquakes in the United States is covered briefly, followed by an explanation of how earthquakes happen and of their effects on structures. The mathematics of building code requirements and how the various factors are determined are discussed in detail. The difference between the design of earthquake structures and ordinary structures is explained, and in-depth discussions are presented on the advantages and disadvantages of reinforced concrete for earthquake design, the importance of maintaining ductile behavior during an earthquake, and the value of transverse reinforcement (ties, stirrups and spirals). Characteristics of three basic types of structures to be considered for earthquake resistant construction are discussed. 6 pp; 84:489

ESTIMATING

Computer Estimating and Job Management: Reportedly, there is hardly an application more ideally suited to use of a computer than construction estimating. By using a computer the contractor can turn out more bids with no increase in estimating staff. A general contractor's experience with computer estimating is described. 2 pp; 84:163

A Large Lump of Concrete: This is the tongue-in-cheek story of a do-it-yourselfer whose knowledge of estimating could have used some fine-tuning. A cubic yard of concrete turned out to be more than he needed to anchor a basketball post. 1 p; 84:589

FLOORS

Dry Shakes for Floors: Surface characteristics obtained with the usual finishing practices aren't adequate for every purpose. Slabs on grade that will be subjected to heavy loads carried on steel wheeled equipment can deteriorate rapidly without protection provided by use of some type of dry shake. Advice

is given on which type of shake to use and how to use it. 3 pp; 84:285

Quality Control to Achieve a Superflat Floor: This is a detailed description of the necessary interactions between the concrete supplier, the construction companies and the floor flatness monitor when a superflat floor is built. 4 pp; 84:291

Precast Leave-in-place Screed Rails for Floor Construction: For use as edge forms these rails have recently been introduced in the United States. Measuring 1 to 6 inches in height and 17 feet in length, they resemble steel railroad rails, can be cut to desired length on the job, and remain in place after concrete placement to become a permanent part of the floor. Installation is rapid because no stakes are needed to hold the forms in place and thus there are no stakes to be removed after concreting. Holes in the sides of the rails permit insertion of dowels or tie rods where needed. 3 pp; 84:483

FORMING

Forms Fly with Wings Folded: An innovative forming system allowed a forming subcontractor to use large form table assemblies on high-rise construction even though the tables had to pass through very small openings. A large diagram shows the details of form's hinged side panels. These could be raised to make form full size during use and then lowered for moving the form from floor to floor through small window openings. 4 pp; 84:385

Charts Simplify Design of Vertical Formwork: A chart is illustrated for design of vertical concrete forms and an explanation is provided of how to use it. Use of such charts can eliminate the need for lengthy calculations. The charts are especially intended for the smaller contractor's use but can be helpful to the estimator who prepares bids for formwork and the contractor or engineer who prepares or checks shop drawings. 3 pp; 84:392

Charts Aid in Design of Horizontal Formwork: Design calculations for commonly used sizes and grades of each member making up a forming system, and then combining the results graphically in a series of six charts will avoid tedious recalculations in the process of designing a structurally sound forming system. The charts were developed especially with the smaller contractors in mind but will also be valuable to the estimator who prepares bids for formwork and to the contractor or engineer who prepares or checks formwork shop drawings. Instructions are provided on how to use the design charts. 3 pp; 84:648

FORMS AND FORMING MATERIALS

Forming Machines Precast Miles of Guideway Girders: This article describes the specialized forming system and equipment required for construction of Vancouver, British Columbia's new public transportation system, much of which is elevated and located in urban areas. Two types of precision forming machines were used for producing hollow box girders—one for straight sections and one for curved members. A sequence of drawings illustrates the forms for the straight girders; descriptions with the drawings note how forming differs for curved members. 5 pp; 84:405

Forming Product Review: About a dozen materials and methods are cited that contribute to improved efficiency and quality in forming. Some save labor costs by making it easier to work on site; others are prefabricated items that replace some of the site work with factory labor. Comprehensive information is provided about each of the items. 6 pp; 84:445

FORM RELEASE AGENTS

Choosing a Form Release Agent: Five basic types of form release agents are described in detail: petroleum oils, emulsions, nonreactive coatings with volatile solvent, waxes, and chemically active agents containing fatty acids. Also noted are release agents that do not fit these classifications but have produced satisfactory results. Many agents now available are complex combinations of ingredients from several of the categories listed. When selecting a proper agent, much depends on the type of form material being used. 6 pp; 84:417

FOUNDATIONS

Earth Structures Reinforced with Steel Strips Resist Lateral Pressures: A patented system is described for building earth structures anchored with horizontally placed steel strips that are tied to vertically placed interlocking precast concrete panels. The system is especially suitable for building retaining walls, sea and river walls, bridge abutments, industrial facilities such as storage silos, and even earth-sheltered homes. Advantages of this method of construction are stressed, and the steps involved in its use are detailed and illustrated. 2 pp; 84:653

Void Forms Used with Caisson-supported Foundations to Prevent Heaving in Expansive Soils: Foundation heaving caused by expansive soils can severely damage homes and other structures. This article explains why soils swell, how damage occurs and how builders can prevent damage. One approach is to build on reinforced concrete grade beams that are supported by concrete caissons. Space must be left between the foundation soil and grade beam to keep the soil from pressing upward on the beam. Corrugated cardboard void forms can be used to create the space and several such products are described. 3 pp; 84:657

HISTORY

Mount Vernon Memorial Parkway: This historic highway was completed in 1932. Located between Mount Vernon and the Arlington Memorial Bridge, it also filled a pressing need for a road to Mount Vernon because by 1928 over 400,000 people visited that site annually. Despite the fact that over a million people now visit Mount Vernon each year, the 8-inch-thick reinforced concrete pavement has held up remarkably well. Details of its construction are reported. 4 pp; 84:137

JOINTS

Use Joints to Control Floor Cracks: The causes of floor cracking are given, and the role of joints in controlling cracking is explained. Isolation joints, control joints, and construction joints are the three types used in slab construction. Each is defined, described in detail and illustrated by means of line drawings. Equipment, materials and the various methods of forming joints are discussed, as are joint spacing and layout considerations. 4 pp; 84:553

Waterstops: Choose Them Wisely and Install Them with Care: The state of the art of waterstop design lags behind the techniques of manufacture and installation. Further, the concrete industry has no detailed guidelines or standards for what size and which shape to use in a given situation. This detailed article provides help in choosing a right size and shape of waterstop and describes the material choices available. Instruction on proper installation is given. Drawings illustrate the following types of waterstop: dumbbell and ribbed, labyrinth, joint-forming, wire-looped edge, expanding, and moldable plastic. 6 pp; 84:569

JOINT SEALANTS

Pavement Joint Sealing—How to Do It Right: Here are some pointers on what we've been doing wrong without knowing it. This article recommends various procedures that greatly extend the lives of joint seals. The recommendations pertain specifically to polyvinyl chloride sealants that conform to ASTM D 3406, "Joint Sealants, Hot-poured, Elastomeric-type, for Portland Cement Concrete Pavements." 3 pp; 84:579

Sealant Halts Bleeding of Asphalt Through Joints of Concrete Pavement: A low-modulus silicone sealant was used successfully to halt bleeding of an asphalt underlayment up through joints and cracks of a 5-inch-thick, 40-year-old concrete pavement at a Texas airport. Thorough cleaning of the joints and sawing them to a width of $\frac{3}{4}$ to 1 inch were important in the procedure for installation of the silicone sealant. 1 p; 84:748

LIGHTNING

Lightning and Concrete: An Explosive Pair: Two Iowa State University civil engineering professors conducted studies of the

action of lightning on and in concrete. Unexplained cracks in a concrete corn silo prompted the study, the results of which demonstrated conclusively that lightning can damage concrete and that the damage seems due less to the amount of electrical energy than to the short time in which it is expended. 2 pp; 84:413

MANAGEMENT

How to Reduce Theft, Vandalism on the Construction Site: The president of Pepper Construction Company lists pertinent precautions that can be taken to increase security. He points out that, while the effect of an increased security program may not be readily apparent (it's difficult to document activity that doesn't happen), the end results of such a program will be lower costs, tighter schedules and increased profitability. 2 pp; 84:176

MARKETING

Marketing Construction Services: Here is helpful advice and some definitive do's and don'ts for general subcontracting firms who wish to avoid common problems encountered in forming their own marketing department. 3 pp; 84:39

Making Concrete Buildings Competitive: Consulting engineer Russell S. Fling discusses in some detail several major reasons why reinforced concrete construction is not being universally adopted in cases where it has clear advantages. The first reason is that advocates of competitive systems market their product well but advocates of concrete have yet to learn more effective marketing skills. Secondly, many structural engineers mistakenly feel that concrete design is more difficult and more time consuming than structural steel design. The third major reason is that the concrete construction industry is poorly organized to meet the demands and serve the needs of owner-developers. The greater part of the article discusses means for improving this situation. 3 pp; 84:803

Your Construction Field Forces . . . A Marketing Partner or Adversary: Describes several ways in which contractors' employees in the field can present a positive marketing image and increase repeat business for the contractor. 2 pp; 84:974

MIXING

The Mobile Batcher Mixer: Whether self-propelled, towed, or parked at larger projects to deliver a continuous flow of concrete, mobile batchers available today offer both concrete users and suppliers a growing number of options in the mixing and delivery of concrete. In addition to conventional concrete, the mobile machines can handle latex modified concrete, wet or dry shotcrete mixes, and patching materials. 4 pp; 84:5

Front-discharge Concrete Trucks: Companies using these trucks cite several advantages that provide them with a competitive edge. The capability of driving directly to the place where concrete is needed is time-saving. In addition, without leaving his cab a driver can discharge concrete, control water addition, swing the chute and move the truck simultaneously. 2 pp; 84:15

POSTTENSIONING

Water-retentive Admixtures for Grouts Serve Post-tensioning Needs: Based upon job experience and research studies, the author advocates that grouts for post-tensioning be made with admixtures to control bleeding. He also cites evidence from which he concludes that flow cone tests are unsuitable for evaluating grouts made with high percentages of water-retentive admixtures. In conclusion, he lists a 7-step procedure for obtaining best grout penetration and corrosion protection. 5 pp; 84:47

Eisenhower Station Features Distinctive Design: The clean, functional and aesthetically pleasing lines of the Metropolitan Area Rapid Transit System station have been achieved primarily by an extensive use of prestressed concrete, all cast-in-place and post-tensioned. Drawings are provided to illustrate the space frame concept that was designed to give the station its distinctive appearance. 3 pp; 84:125

PRECASTING

Precast and Cast-in-place Concrete Used to Speed High-rise Construction: Wah Luck House is a 10-story apartment tower and cultural center in Washington, DC. A patented building system raised the tower at a rate of one floor every two days. The system uses factory production-line techniques to make prestressed and precast elements, then trucks them to the building site, lifts them into place and joins them together with reinforcing steel and site-poured concrete. **3 pp; 84:131**

Prefabricated Concrete . . . Enlarging the Concrete Construction Market: Precast concrete can be used to improve efficiency in building construction. Using either a design-competitive bidding or design-construct approach, there are opportunities for employing precast elements such as tilt-up walls, precast stairs and other precast units to make concrete more competitive in the building marketplace. This article traces developments in precast and cast-in-place construction. **3 pp; 84:122**

QUALITY CONTROL

Getting Quality Assurance Right Now: The author discusses improvements made in a system of equipment known as the Concrete Quality Monitor (CQM). The CQM can be used in the field to measure water-cement ratio and to ensure the quality of concrete being placed. Reportedly, the test can be made within 10 to 15 minutes and at a cost of only about \$5.00 per test, assuming three complete tests per hour. **3 pp; 84:317**

RAILROADS

Concrete in the Railroad Roadbed: Prestressed concrete ties have been used for many years. Now, precast or cast-in-place solid concrete slabs on which tracks are fastened directly are being built in several countries. Cast-in-place slabs are most commonly made with the use of side forms and conventional paving equipment but slipform equipment has also been used. Precast slabs and ladder units are installed by crane. The advantages, disadvantages and economics of using concrete for railroad construction are discussed. **2 pp; 84:309**

REINFORCEMENT

General Principles for Bar Placing: Article is excerpted from the Concrete Reinforcing Steel Institute's book titled *Placing Reinforcing Bars*. Concrete cover and bar placing tolerance requirements are explained. Numerous illustrative diagrams are included with the article. **3 pp; 84:155**

Types of Rebar Ties: Five types of ties that may be needed for floors, walls, heavy mats, columns or preassembled cages are diagrammed to illustrate proper tying procedures for maintenance of bar position. All information presented is based on the Concrete Reinforcing Steel Institute's book titled *Placing Reinforcing Bars*. **2 pp; 84:499**

Beam Configuration and Repetition Lead to Use of Welded Wire Fabric: Constricted spacing for reinforcement, combined with the opportunity to fabricate the steel almost identically for 500 tree-shaped beam-slab-column units, led to a decision to use custom-fabricated welded wire fabric. The efficiency of the operation saved several hundred thousand dollars and was credited with bringing the job to completion three months ahead of time. The details of how the reinforcement was fabricated and shipped and the construction schedule adopted are given. **2 pp; 84:591**

REPAIRING

An Effective Repair for Leaking Waterstops: A hydrophilic polyurethane grout described here can be injected to seal leaking joints without removing the existing waterstops, even if the water is leaking at the time of the repair and even if the joints contain failed waterstops. The material has been used to repair leaking waterstops or cracks in various below-grade building foundations and parking decks, dams, tunnels, drinking water reservoirs, water or waste-water tanks and other structures. **3 pp; 84:594**

Kansas Bridges Renovated by Post Reinforcement and Thin Bonded Concrete Overlay: This is a description of a Kansas Department of Transportation bridge repair technique that both

repairs cracks and increases a girder's shear capacity. Called post reinforcement, the method involves filling a series of drilled holes with epoxy and inserting a rebar in each. In cases where the bridge deck is severely deteriorated, a thin-bonded overlay is used in addition to post reinforcement. Cost of the new method of repair is said to be well below that for removal and replacement of shear-cracked girder sections of bridges. **4 pp; 84:705**

Thin Polymer Concrete Bridge Deck Overlays: Initial costs for polymer concrete bridge deck overlays $\frac{1}{4}$ to $\frac{5}{8}$ inch thick can be high, but when properly applied the overlays can be cost effective in terms of durability. This article discusses lessons from past experience with the overlays, required properties for overlay components, and application methods, for example the broom-and-seed method and the slurry method. **3 pp; 84:711**

Selecting Repair Materials: When choosing repair materials, the true repair professional considers three things: the conditions of the repair, properties of the repair materials to be used, and the skill and equipment needed to do the job. Material properties discussed here include: dimensional stability, coefficient of thermal expansion, modulus of elasticity and permeability. Influencing factors in the selection of a suitable material include ease of application, cost, and available labor skills and equipment. **4 pp; 84:865**

Properties and Specifications for Epoxies Used in Concrete: Epoxy formulators can combine different resins, hardeners and modifiers to produce an almost infinite variety of end products. The American Society for Testing and Materials (ASTM) has published a standard specification, ASTM C 881-78, which classifies epoxy-resin bonding systems by type (depending on kinds of materials to be bonded), grade (based on flow characteristics), and class (defined by temperature range within which the systems are suitable). ASTM has also published test procedures for measuring important performance properties: bond strength, shrinkage during curing, and thermal compatibility. All ASTM material noted here is explained in this article. **4 pp; 84:873**

Acrylic Concrete for Fast Repair: Acrylic concrete contains no water and no portland cement. Usually it is made with either of two monomers as a binder: methyl methacrylate (MMA) or high molecular weight methacrylate (HMWM), a relatively new material that has been used for only the last two or three years. Acrylic concrete can cost \$50 a cubic foot so its use is limited. However, because it develops compressive strengths of 5000 to 10,000 psi in 1 to 2 hours, it has been used to repair pavements, parking decks and floors that cannot be closed to traffic for several hours or days. This article discusses uses and advantages of acrylic concrete, considerations in the choice between MMA and HMWM as a monomer, making and working with the concrete, and safety precautions. **4 pp; 84:881**

Latex-modified Concrete and Mortar for Repair: Synthetic latexes are made by dispersing polymer particles in water to form a polymer emulsion. When added to portland cement concrete, the resulting mixture develops higher strength, bonds better to existing concrete, has a higher resistance to chloride penetration and is more resistant to chemical attack than is plain concrete. Explanations are given of how to determine latex dosage for a specified mix, how the mortar is applied to an area to be patched or repaired, curing procedure (which is different from that for plain concrete), limitations on the use of this material, and its availability and packaging. **3 pp; 84:889**

Nonshrink Hydraulic Cement Mortars and Grouts: Article includes useful data on three types of nonshrink hydraulic cement products: patching mortars and concretes, grouts and anchoring cements, and fibrous patching mortars and concretes. Applications best suited to each of the three types of product are shown in tabular form. Other tables show the characteristics of nonshrink patching mortars and concretes and those of nonshrink grouts and anchoring cements (including both metallic and nonmetallic materials). Fibrous patching mortars and concretes are discussed. **4 pp; 84:893**

High Density Polyethylene Sheet Stops Pool Leaks: A plastic liner made of high density polyethylene sheeting solved a

cracking and leaking problem in a 200,000-gallon pool at Boston's New England Aquarium. In addition, the liner was installed while the aquarium was open to the public. Coloring of the polyethylene, normally produced with carbon black, was reformulated to use color dyes that simulated the blue, gray, black and several shades of green characteristic of an ocean floor. 1 p; 84:901

Steel Plates Strengthen Bridge Deck: To strengthen an existing bridge so that a truck and load weighing 450 tons could pass over it, steel plates were glued to the underside of the bridge deck. Plates were first suspended beneath the bridge by threaded bars. Epoxy adhesive was applied to the underside of the bridge and to the top of the steel plates which were then pressed up against the deck by tightening nuts on the bars. 1 p; 84:999

SAFETY

A New System to Contain Hazardous Wastes: The Portland Cement Association has developed a composite liner for use in impoundments of hazardous wastes. It consists of high-density polyethylene membrane placed between two 6-inch compacted layers of soil cement. The liner reportedly offers a high degree of reliability against seepage, is durable, and provides a firm working surface. 1 p; 84:662

Preventable Injuries Associated with Accidents While Handling Reinforcing Steel: Research studies have shown that nearly half of construction injuries (and dollar costs for treatment) occur during manual handling of reinforcing steel. The findings have been used to redesign procedures for repetitive manual material handling tasks that may cause accidents. Charts show recommended numbers of workers needed to lift and carry reinforcing bars of various sizes. 2 pp; 84:732

Build Safety Into Your Concrete Pumping System: Steps to take in preventing pumping accidents are described. These include checking pipelines and couplings for wear, using the right hose, providing tie-downs and support brackets, and carefully cleaning out the lines after the daily pumping job. 2 pp; 84:1001

SCULPTURE

Spirit of Black Hawk: Landmark Concrete Sculpture: This is the story of the sculpting of an immense concrete statue that depicts a typical American Indian. It stands on a high river bluff near Oregon, Illinois. The heroic work, which rises 53 feet above ground level, was conceived and executed over 70 years ago by the eminent sculptor, Lorado Taft. 4 pp; 84:299

Precast Prestressed Concrete Sculpture: A pictorial review of the construction details for a 21-ton tower made of precast concrete with stainless steel reflecting plates. Designated as "Adventure in Concrete," the tower is a monument to the achievements of Thomas W. and Arthur Anderson at Concrete Technology Corporation in Tacoma, Washington. The tower was designed and constructed by their fellow workers. 3 pp; 84:313

Fountain of Time—Mighty Sculpture Cast in Concrete: Described when it was new as one of the most colossal undertakings in the history of American sculpture, the *Fountain of Time* is a 120-foot-long cast-in-place exposed aggregate concrete work of art. Conceived by the eminent sculptor Lorado Taft, the massive sculpture was completed more than 60 years ago. John J. Earley, noted authority on exposed aggregate concrete, worked with Taft in developing the mix design and selecting the aggregate to be used. 4 pp; 84:797

What's New in Lou Rankin's Concrete Sculpture Art: A description of how artist Lou Rankin creates bears, apes, birds and other animals using concrete. Illustrated with photos of completed sculpture art, the article describes some of Rankin's newly developed techniques that include the use of metal frames or armatures and fast setting mixes. 3 pp; 84:1093

SHORING

Shoring Towers Keep Bridge Open to Traffic During Repairs: Difficult shoring requirements posed during rehabilitation of an arch bridge were solved with a high capacity shoring system

erected from the ground up. This article provides an explanation of the design and erection of the system. 2 pp; 84:744

SHOTCRETING

Dry- and Wet-mix Process Shotcrete: Batching procedures differ for dry-mix shotcrete (sometimes called gunite) and wet-mix shotcrete. But with both types the mortar or concrete is shot into place by means of compressed air through a hose equipped with a nozzle. With the dry-mix process, water is added at the nozzle just as the cement and aggregate mix is forced through it; the amount of water used is governed by the nozzleman and the technique requires some skill. With the wet-mix process all ingredients are mixed before entering the hose, giving more precise control over the amount of water used. Application techniques are discussed, suggestions are made to help determine which process is better for the job at hand, and some cost data are provided. 2 pp; 84:629

Shotcrete Reduces Cost of Spillway Crest Construction: Constructing the spillway crest for Willow Creek Dam in Oregon could have been a dangerous and expensive job if conventional concrete placement techniques had been used. Instead, wet-mix process shotcreting methods saved money and made construction indisputably safer. The job also produced some evidence which suggests that doing strength and air content tests on concrete shot directly into the cylinder mold or air meter bowl may produce results that are more realistic than those obtained with the use of test cylinders made from a sample of wet mix taken from the truck and rodded into the mold in three layers. 4 pp; 84:633

Nozzling Dry-mix Shotcrete: A skilled, knowledgeable nozzleman with properly functioning equipment and suitable materials is the key to good shotcreting. By any change of sound and air velocity, he can anticipate and adjust the water supply to deliver a properly proportioned material on the receiving surface—with just the right amount of water for hydration, for avoiding sandpockets and for consolidating shotcrete that does not slide or slough off. Equipment is discussed and proper placing techniques are illustrated and explained. 4 pp; 84:641

SLABS

How to Double the Value of Your Concrete Dollar: Simple arithmetic is used to demonstrate that dollars spent to produce a thicker floor greatly increase load carrying capacity of the floor. Even small increases in slab thickness give a big boost in strength. Aside from such common crack-causing deficiencies as inadequate curing, too widely spaced joints and overly wet mixes, the one most commonly overlooked but fundamental problem has been inadequacy of the floor slab thickness. 2 pp; 84:902

SOIL-CEMENT

Soil-cement: It's Not Just for Highways Anymore: A mixture of natural soils, portland cement and water, soil-cement has a long record of satisfactory service as a paving material for highways, streets, and airports. In addition, however, over 10 million cubic yards of it have been used for slope protection, seepage control, foundation stabilization and pipe bedding. Its use in these applications is described. 4 pp; 84:31

Soil-cement Construction: Using soil-cement methods, paving contractors can now build energy- and water-resources structures. Soil-cement construction often provides the most economical means of building canals, dikes, dams, lagoons, foundations, coal storage pads and other structures. The author provides descriptions of how it's done. Basic requirements cited include: proper cement content, adequate moisture content, adequate compaction and proper curing. 4 pp; 84:725

SPECIFICATIONS

Specifications for Epoxy-coated Reinforcing Bars: This article is a condensation of the Concrete Reinforcing Steel Institute's Engineering Data Report Number 19, "Suggested Project Specifications Provisions for Epoxy-coated Reinforcing

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Bars." The provisions, which are set forth in the article, reportedly could be readily entered verbatim into the job specifications for projects where bars of this type are to be used. A general discussion of the individual suggested provisions is provided. **4 pp; 84:809**

STAIRS

Precast Stairs Speed Concrete Building Construction: A patented system for installing precast concrete stairs is described. It uses braced steel frames to temporarily support the precast units but leaves enough clearance to permit immediate use of the stairs. Stairs may be precast either at a plant or at the jobsite and are normally installed above the topmost form deck before the concrete there has been cast. It is also possible to cast the slab first, leaving a box-out for the bottom stair dowels. When the stairs are placed later, they are secured by filling the bottom pocket with concrete. **2 pp; 84:970**

SUMMER CONCRETING

How to Cope with High Concrete Temperatures: Precautions that can be taken when concreting during periods of high temperature are described. Estimates are made that as much as 23 percent of concrete strength can be lost under certain conditions during hot-weather concreting. Effects of curing conditions on strength development of test cylinders are discussed. **2 pp; 84:508**

TESTING

Permeability Testing Has Been Simplified: A method for testing concrete permeability is described that is said to be easy for quality control personnel to perform routinely and with equipment with which they are familiar. The method is used with a commercial test kit that makes it possible to investigate characteristics other than just permeability. **2 pp; 84:167**

Proposed Field Test for Drying Shrinkage of Concrete: The author of this article considers use of ASTM C 157 method to predict cracking of concrete to be erratic, misleading and excessively expensive. The artificial conditions of the test procedures and the small specimen size give data that do not relate to actual field conditions. A recommendation is made that the standard size of test specimens be increased to 4x4 feet by 8 inches thick. **3 pp; 84:663**

Specialized Concrete Evaluation and Testing: When concrete problems occur, consultants can provide a wide array of specialized testing techniques to diagnose the problem, determine severity of the defects and recommend corrective action. Techniques ranging from simple visual observation to use of sophisticated instrumentation can be used to investigate problems such as low strength, internal voids, inadequate air content, and various forms of deterioration. These techniques are described. **4 pp; 84:1097**

TILT-UP

New Look in Tilt-up: Exteriors of load-bearing concrete tilt-up panels for the walls of the Grande Boulevard Mall in Jacksonville, Florida were patterned to resemble 16x32-inch rusticated stone blocks. Techniques for creating a concrete mix that gave the blocks a rough-granite appearance with good uniformity are explained, as is the innovative forming system for the three basic types of panels used and their many minor variations. **3 pp; 84:477**

TOOLS

Choosing a Wheelbarrow: A wheelbarrow is only a wheelbarrow, right? One is as good as the next, right? WRONG. Wheelbarrows are not all the same. Some last longer and some let you last longer using them. Here are a few tips on how to choose a good one and how to use it properly so you won't end up with a permanent "wheelbarrow back." **2 pp; 84:737**

WALLS

Precast Barrier Walls Shield Microwave Antenna: This is a description of a precast concrete barrier wall installed at a satellite earth station in New Jersey to shield a huge dish antenna from signal clutter in the dense radio frequency environment there. A special texture precast on the inner faces of 18x8-foot wall panels, together with natural undulations in the arrangement of the 1800 feet of panels around the antenna, effectively disperse the unwanted radio signals. **2 pp; 84:741**

WATERPROOFING

Preventing Rebar Corrosion with Silane: A spray-on solution of silane can help keep out water and chlorides that cause rebar corrosion problems in concrete. The way in which silanes work to keep out water is explained. Surface preparation and application techniques are described, as are the precautions that are necessary when working with the material. **2 pp; 84:969**

WINTER CONCRETING

What to Do with Concrete in Cold Weather: Freshly placed concrete that freezes at an early age suffers strength loss, increased permeability and reduced resistance to weathering. In addition to protecting the new concrete until it reaches necessary strength levels, the concrete should be allowed to cool gradually when the protection is removed so that a rapid temperature drop doesn't cause it to crack. Charts show the number of days of protection recommended for cold weather concrete under various conditions and made with normal or high early strength cement. Also, considerable information is provided on the careful advance planning needed: concrete production; delivery, placing and finishing; curing and protection; testing and inspection. **4 pp; 84:789**

Effect of Freezing Concrete at Early Ages: The ten-year-old author reports findings from a study he made of how concrete strength-gain potential is affected when the material is allowed to freeze at age intervals ranging from 1 hour to 9 days. There was little effect upon strength for specimens frozen 18 hours or later after casting. **2 pp; 84:821**

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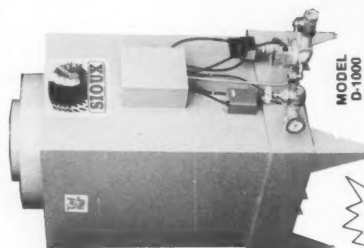
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